RTCA Special Committee 214 – Standards for Air Traffic Data Communication Services

An Overview for E-Operations Workshop

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What is RTCA SC-214 doing?

- In plain terms:
  - Update of CPDLC (and ADS-C) specifications with new assumptions
    - ATN instead of ACARS
    - Primary means of communication – voice not required
    - Goal of worldwide applicability
    - Consider requirements of NexGen, SESAR, etc.
  - These changes in scope ripple through the definitions of services and data links.
  - Backwards compatibility is expected for portions of CPDLC that have been implemented.
- These standards will drive the next generation of airborne capability.

What SC-214 is NOT

- ADS-B covered by SC-186/WG-51
- AIS/MET services covered by SC-206/WG-76
- Data Link Security covered by SC-216/WG-72

Motivation

- **NextGen concepts of use require transmission of complex trajectory clearances, weather information and air traffic advisories.**
- **Data communications will:**
  - **Provide for a more efficient air/ground (A/G) information exchange mechanism**
  - **Provide an additional means of communication between pilots and controllers**
  - **Reduce congestion on the voice channels**
  - **Reduce operational errors and pilot deviations resulting from misunderstood instructions and read back errors**
  - **Enable trajectory based operations**
  - **Reduce controller and flight crew workload.**

Data Link Standards Objectives *

** Objectives documented fully in the TORs (Terms of Reference), which are still under negotiation with Europe.*

- Work jointly with EUROCAE Working Group 78 in producing identical documents
- Develop standards to support two contexts for use of the data communication services which:
  - are required to support certain ATS functions, but not required for entry into the designated airspace, and
  - are required for entry into the designated airspace.
    - NOTE: An independent ATC voice communication service continues to be required, and its role will need to be characterized to the extent that it is considered in establishing the safety and performance requirements for the ATC communication services.
- Allocate requirements to aircraft systems, ATS ground systems, and communication services

Data Link Standards Objectives (cont.)

Identify the data communication services and characterize the operational environment expressed by the following:

- Next Generation Air Transportation System (NextGen),
- Single European Sky ATM Research (SESAR) program,
- FAA Operational Evolution Partnership (OEP),
- EUROCONTROL data link activities (CASCADE, ADAS DUG),
- International Civil Aviation Organization Data Link Steering Group (ICAO DLSG), and
- FAA/EUROCONTROL Future Communications Study, Communications Operating Concept and Requirements (COCR).

Standards Development Waterfall

Environment Review & Revision

Operational Service Definition

Operational Safety Analysis

Operational Performance Analysis

Safety & Performance Requirement Definition

Technology Independent Enterprise Information Service Definition

Operational Services and Environment Document (OSED)

Interoperability Requirement Definition
- ATN
- ARINC 623
- FANS Accommodation
- Internet Protocol

Subsequent Activities

Avionics Implementations

2-3 years

Installation in Airline Fleet

7 years

Ground Automation Tool Developments

X years

Installation in ATC Facilities

Y years

Committee Outputs

- *SPR (Safety and Performance Standard) for Advanced ATS Data Communication*
- *Interoperability Standards for:*
  - *Data Communication Via ATN*
  - *Data Communication Via ARINC 623*
  - *Data Communication Via a Mix of ATN and FANS-1/A*
  - *Data Communication Via Internet Protocol (IP)*

- SPR and Interops to be Delivered Incrementally:
  - December 2008
  - December 2009
  - December 2010

- "We expect that these standards will be the basis for an equipage mandate to take effect in the United States sometime between 2017 and 2020."

Services Included

- Work Package 1 (DO-290 services)
  - Data Link Initiation Capability (DLIC)
  - ATC Clearance Service (ACL)
  - ATC Communication Management Service (ACM)
  - ATC Microphone Check Service (AMC)
  - Departure Clearance Service (DCL)
- Work Package 1 (Additional)
  - Data Link Taxi (D-TAXI)
  - Data Link Operational Terminal Information Service (D-OTIS)
    Note: Includes D-ATIS, NOTAMS & VOLMET
  - **Common Trajectory Coordination (COTRAC)**
  - **Flight Path Intent Service (FLIPINT)**
  - Airborne Situational Awareness In-Trail Procedures (ATSA-ITP)
- Work Package 2
  - Data Link Runway Visual Range (D-RVR)
  - Data Link Flight Update Service (D-FLUP)
  - Data Link Hazardous In-Flight Weather Advisory Service (D-HIWAS)
    Note: Includes Microbursts, Wind Shear, Wake Vortex, Special Air Reports & SIGMET
- Work Package 3
  - Merging and Spacing (M&S)
  - Crossing & Passing (C&P)
  - Paired Approaches (PAIRAPP)
  - Airborne Spacing & Separation In-Trail Procedures (ASPA-ITP & ASEP-ITP)

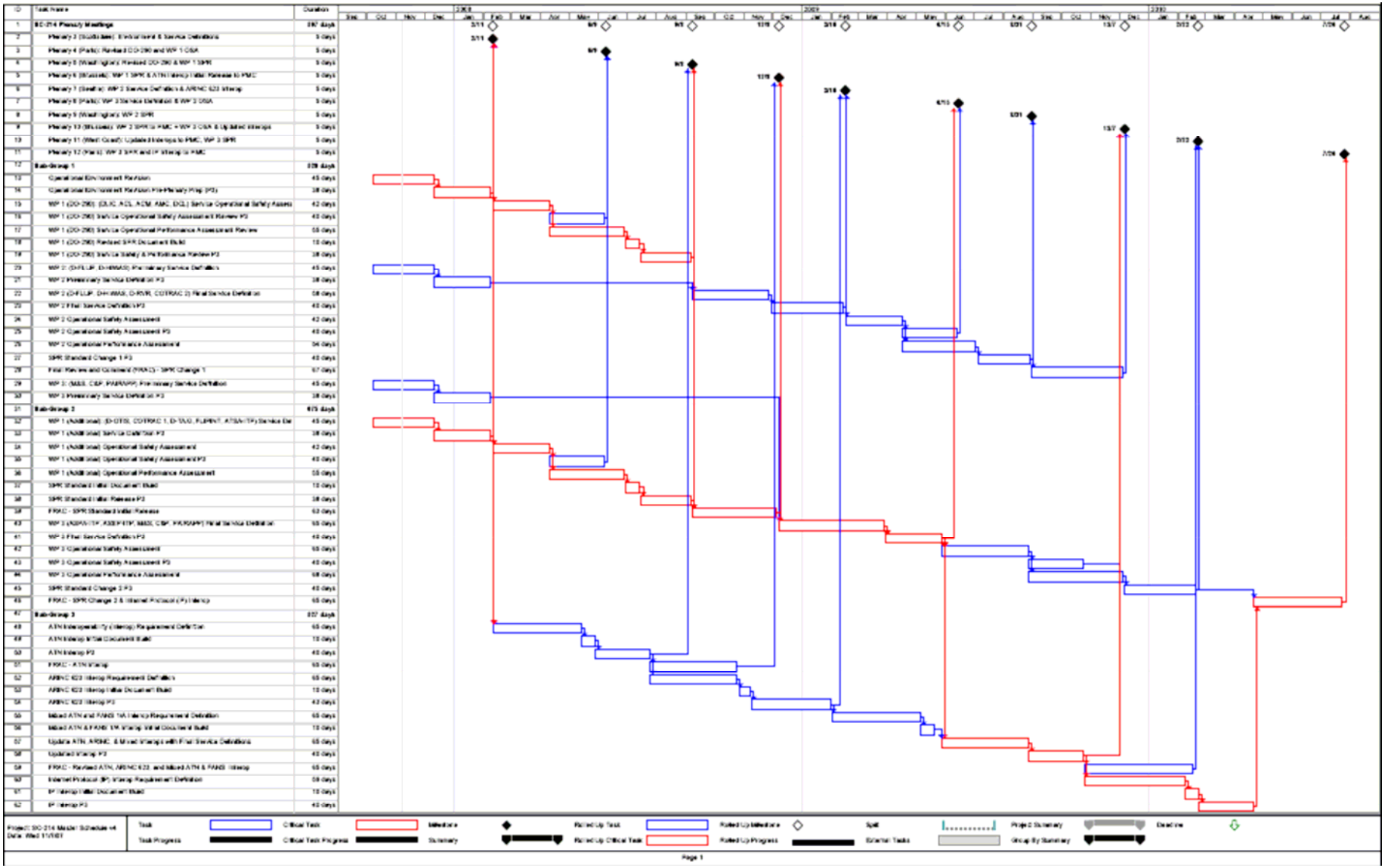
4D-Trajectory Negotiation

- Latest committee discussion combines COTRAC and FLIPINT datalink services into a collection called 4D-TRAD (4D Trajectory Datalink)

- 4D-TRAD includes the following services
  - Ground uplink of 4D trajectory clearance
    - Uplink can include 0, 1, or multiple RTA constraints
  - Aircraft downlink of 4D trajectory request
    - User-preferred trajectory
  - Coordination required between multiple ATC units.
  - Trajectory Conformance Monitoring (ADS-C)

- Service description acknowledges importance of similar wind/temperature models between air and ground trajectory prediction systems, but definition of wind/temperature datalink messages currently beyond scope of SC214.

It looks like the service to get a wind/temperature uplink specific to the flight plan route is falling through the cracks.



For More Information

http://www.faa.gov search for “sc-214”

http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/sc214/

NOTE: RTCA’s SC214 web page is out of date

- SC214 Chair
  - Paul Mettus, Lockheed Martin, paul.mettus@lmco.com
- FAA Designated Representative & SG2 chair
  - Gregg Anderson, Gregg.Anderson@faa.gov
- SG1 Chair
  - Rich Rawls, Boeing, richard.c.rawls@boeing.com

Upcoming Meetings

- SG1 has biweekly teleconferences
- SG2 has monthly meetings. Next one is Jan. 22 in Brussels.
- Plenary meeting Feb. 11-15 in Scottsdale, AZ.